

ADDITIVE MANUFACTURING EUROPEAN CONFERENCE

23 JUNE 2015 | BRUSSELS



Takeaways

On June 23, 2015, additive manufacturing (AM) was given a unique showcase at the European Parliament in Brussels when CECIMO, the European Association of the Machine Tool industries, held the first “Additive Manufacturing European Conference”. At the event, hosted by Reinhard Bütikofer, Member of the European Parliament (Group of the Greens/European Free Alliance), representatives from AM companies, EU institutions, think tanks and the machine tool sector discussed how the full-scale industrialisation of AM could be achieved in a rapid and cost-effective manner, and how this so-called “disruptive” series of technologies could help create the highest value for the economy and society. The participants also gave their input on the regulatory framework conditions and the business challenges and opportunities in Europe, as well as their impact on the development of AM. The discussions focused on the role played by governments, industry, academia and the research community in the development of AM and on the potential for advances and growth offered by pan-European initiatives.



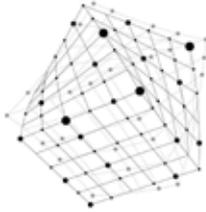


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CECIMO press release

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Industrializing “additive manufacturing” for a competitive and sustainable economy

Brussels, 26 June 2015 – At the “Additive Manufacturing European Conference” organized by CECIMO, the European Association of the Machine Tool industries, at the European Parliament in Brussels on 23 June, high level representatives from industry, academia, EU institutions, think tanks and standardisation organisations discussed how to achieve the full-scale industrialisation of additive manufacturing (AM) in a rapid and cost-effective manner whilst generating the highest value for society.

The Conference confirmed that AM creates perspectives in terms of technology, markets and economic development, as well as sustainability. The design freedom brought by AM stretches the imagination of designers and engineers to develop highly functional products which respond to complex customer needs. Moreover, layer-by-layer production generates unprecedented savings on material and energy usage, making AM a blueprint for sustainable and competitive manufacturing.

Jean Camille Uring, CECIMO President said: “Additive manufacturing can satisfy Europe’s appetite for innovation and can boost the added value of industrial production. AM is still a relatively young technology which needs to be further developed so that its full potential can be unleashed. Europe has to move fast amidst global competition to turn AM into a mainstream technology that serves multiple sectors.”

Reinhard Bütikofer, Member of the European Parliament, hosting the conference stated: “Europe is in dire need of new economic dynamism. Additive manufacturing offers great potential for disruptive innovation. It can boost industrial competitiveness and, at the same time, deliver significant material and energy efficiency gains. We need an ambitious EU industrial policy that taps into new technologies and industrial trends to promote competitiveness and sustainability”. He underlined that, to enable the market uptake of AM, this policy should address research and development needs and promote SME finance, awareness raising, standardisation and skills.

It was recognised that AM is an integral part of the digitisation trend in manufacturing. AM allows to convert digital data into products whilst disrupting existing production processes and supply chains. Supply chains are shifted to the virtual environment and the storage requirements are reduced to the hardware necessary to store files. By promoting mass-customization and on demand-production nearby customers, AM can become a key driver of Europe’s reindustrialisation.

At the conference, strong emphasis was put on the impact of AM on the society. Although industrial AM applications find their way across sectors such as automotive and energy, the aerospace and medical sectors appear to be the two main early adopters. Lightweight construction of air vehicles allows saving thousands of tons of emissions every year. AM drives efficient production of customized prosthetics and implants, providing a better quality of life to hundreds of thousands of people at reduced costs.



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Filip Geerts, CECIMO Director General: “Additive Manufacturing is moving fast towards becoming a mainstream technology. However there are challenges and obstacles on the way to its industrialization that should be cleared and to that end, adequate government policy must play a role in technology development and market uptake. With the know-how, skilled workforce and resources, Europe has the potential of becoming a global center of excellence in AM”

Commenting on the outcome of the event, **Clara de la Torre, Director for Key Enabling Technologies, at DG Research of the European Commission**, stated: “Only in the 7th Framework Programme (2007-2013), €160 million in EU funding was granted to more than 60 successful projects on additive manufacturing technologies. In the first year of the Horizon 2020 Programme, in 2014, nine AM projects and actions were selected to benefit from more than €17 million in EU funding.” She highlighted that AM benefits from funding both as a ‘key enabling technology’ and as a solution provider to ‘societal challenges’.

Industrial and research stakeholders attending the event underlined that the continuation of EU funding is essential to overcome current technical limitations to AM. It will also bring the technology closer to series production which will unlock its full economic potential.

The strongest message that came out of the Conference was a call to the EU to adopt a “European strategy for Additive Manufacturing” which bridges complementary capabilities and resources across Member States. It was highlighted that such a strategy should look beyond research funding so as to accelerate the market uptake of AM, including standardisation, finance, awareness raising, skills, IPR, liability as well qualification and certification procedures. Especially, standards will be instrumental to build market confidence in this new technology. Education and skills appear to be the key enabler of AM market uptake. Innovation in AM is driven by usage, therefore, it is essential to place AM in education curricula, and to give students and the industrial workforce access to hands-on training. Designers and engineers will be the ones to set free the transformative power of AM across sectors, be it machine tools, aerospace or automotive.

Mr. Geerts concluded: “Europe does not have the luxury to lag behind competitors in disruptive technologies which transform the economy. It has to aim at global leadership. We hope that the new EU Industrial Policy Roadmap and the Digital Single Market Strategy will give the necessary attention to AM”. He also invited all the stakeholders to contact CECIMO to participate in the association’s AM-related activities.

About CECIMO

CECIMO is the European Association of the Machine Tool Industries. We bring together 15 national Associations of machine tool builders, which represent approximately 1500 industrial enterprises in Europe*, over 80% of which are SMEs. CECIMO covers 98% of the total machine tool production in Europe and about one third worldwide. It accounts for almost 150,000 employees and a turnover of nearly €23 billion in 2014. More than 80% of CECIMO production is shipped abroad, whereas two thirds of it is exported outside Europe*. For more information visit www.cecimo.eu.

*Europe = EU + EFTA + Turkey

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Additive manufacturing:

A European common strategy would surely create opportunities for the machine tool industry

A note from Filip Geerts, CECIMO Director General

Additive manufacturing (AM) technologies have become a genesis for re-imagining product design and development as well as materials, business models and services. National governments around the world are launching policy initiatives on AM in an attempt to secure their share in future markets for advanced processes and products. There are strong signals that these technologies serving as a battlefield for regions competing over global technology and economic leadership.

We have to ensure that the EU stays in the global race for disruptive manufacturing technologies like AM.

In the aftermath of the global economic crisis, countries have become especially eager to deploy industrial and technology policies to respond to the stubbornly low growth rates. Since the traditional drivers of GDP growth, government investment and consumption for example, are not delivering the expected results, governments see in many of the recent disruptive technologies a high potential to boost productivity, efficiency and innovation. They keep an eye out for opportunities to tap into new markets with new products whose development is driven by a few key technologies such as big data, industrial internet and 3D printing.

They generally play a role as risk-taker, financier and in the coordination between researchers, industry, investors and other stakeholders. For example, the UK and Germany have grant programmes in place for investment in innovation centers for basic and applied research programmes.

The EU has also taken initiatives. According to figures from the European Commission, public funding distributed to AM-related research within the 7th Framework Programme (2007-2014) amounted to €160 million. In the EU Industrial Policy Communication and the new Horizon 2020 programme, AM also receives high attention as a strategic enabling technology.

More and more industry experts and politicians all over the world agree that countries now furnishing their industrial base with advanced technologies will be tomorrow's global industry leaders. Also, the broad-based deployment of additive manufacturing can have a broad impact and can transform at once multiple sectors. EU politicians must understand this and take the necessary actions.

Heard during the Additive Manufacturing European Conference:

"AM represents a series of "disruptive technologies" which can have positive impacts on materials and energy saving, reducing supply chain costs and on enhancing education and skills. The machine tool industry has always been on the forefront of innovation and CECIMO members are closely following the developments in AM, looking out for growth opportunities for the sector." **Jean-Camille Uring, CECIMO President and Executive Board Member of Fives Group**



"New technologies such as AM must take in consideration the importance of sustainability in manufacturing, both in terms of reduced energy and materials consumption and of workers' health and safety." **Reinhard Bütikofer, Member of the European Parliament (Group of the Greens/European Free Alliance)**



"Standards must represent the current state-of-the-art of a technology, and the AM community is working on developing unified international standards." **Jorg Lenz, Collaborative Projects Coordinator – EOS GmbH**

"Additive manufacturing is moving at a fast pace towards becoming a mainstream technology, but some challenges and obstacles still need to be cleared. Government policy must play a role in technology development and market uptake. We need European action and European rules to unlock the full potential of this technology." **Filip Geerts, CECIMO Director General**



"Education and training are fundamental for the constant development of AM. They will allow multiplying success stories like the collaboration between Stratasys and Airbus, leading to over 1000 3D printed end-use flight parts being used in the new A350 XWB." **Andy Middleton, EMEA President of Stratasys**



"Only in the 7th Framework Programme (2007-2013), €160 million in EU funding was granted to more than 60 successful projects on additive manufacturing technologies. In the first year of the Horizon 2020 Programme, in 2014, nine AM projects and actions were selected to benefit from more than €17 million in EU funding." **Clara de la Torre, Director for Key Enabling Technologies of the Directorate-General for Research & Innovation at the European Commission**



"Along the AM value chain, the availability of materials plays a key role, technological development is going hand in hand with the development of materials." **Stefan Ritt, Head of Global Marketing and Communications at SLM Solutions**

"The harmonization of international standards for additive manufacturing is the ASTM F42 members' goal. The AM industry can only continue its healthy development and reach a steady growth with the help of uniform and coherent standardization." **Pat Picariello, Director of ASTM International and responsible of Committee F42 on AM standards.**



"AM has a significant impact the industrial landscape, regional economies and governmental policies." **Benjamin Denayer, Senior Business Developer Additive Manufacturing of Sirris**



"In the UK, AM represents a key developing sector and the national government plays a fundamental role to support its development." **Clare Marett, Head of Manufacturing and Business Investment Department for Business, Innovation & Skills UK**



"AM is a key enabler for accelerated engineering processes, highly efficient products and new agile supply chains, which are all of high strategic relevance for the European industry. The market for AM is still expected to grow significantly in the next 10 years and technical applications for prototyping, small series production and "smart" AM products will be the key drivers of growth. Europe still has a leading role but its leadership is challenged by new competitors from Asia and the US." **Bernhard Langefeld, Principal – Roland Berger Strategy Consultants**



Mr. Jose Lorenzo Valles – Head of Unit, Key Enabling Technologies Directorate, DG RTD/D, European Commission



"An important key to AM's development is the creation of educational programs which correspond to the new needs of the industry: AM can truly offer new jobs and professional opportunities to the new generations." **Onno Ponfoort, Senior Managing Consultant – Berenschot**

"AM is in constant growth along the whole value chain and there is a clear need for better and more stable coordination of all AM stakeholders." **Martin Schäfer, Project Manager Research & Technology Center, Siemens AG**



"With AM, we are entering a new technology era that will lead to economic growth. The sectors that should benefit the most are medical, automotive and aerospace." **Thierry Rayna, Professor of the Novancia Business School**



"Research and innovation are fundamental to develop more efficient industrial applications and R&I activities are part of Prima Industrie's core strategy." **Ezio Basso, Managing Director of Prima Industrie**



Additive manufacturing: What role for government policy?

Give support to research and innovation

As manufacturing becomes increasingly complex, it requires combining multi-sectoral and multidisciplinary capabilities in technology development. Advanced manufacturing technologies like additive manufacturing (AM) develop at the intersection of production technology, ICT and materials science. The EU, given its experience in supporting pre-competitive collaborative research, has a great potential to facilitate the development and market uptake of AM.

AM still faces various technical barriers to its industrialization (e.g. repeatability, process reliability, work piece maximum size and surface finish quality), leaving vast areas to explore for the research community and industry. Most of these challenges are either too difficult or too risky for businesses to tackle on their own, which is why governments must participate and invest in research and innovation.

A sufficient amount of research grants should be earmarked for AM in the Horizon 2020 programme, notably for application-oriented projects to help bring AM into the production environment and AM products to the market. The successful Factories of the Future public-private partnership has shown that using industry-driven research roadmaps is an effective way of

guiding public funding towards market innovation. The key will be to provide significant visibility to AM inside the EU research programmes so that the EU commitment resonates strongly with the global investment community. However, EU funding alone will not be enough: Member States also need to come on board and increase national R&D funding for AM.

Government-backed manufacturing innovation centers and collaborative networks need to be created to pool resources, knowhow and skills from a variety of disciplines. This will enable industrial and research actors to address together, on a joint infrastructure, complex innovation challenges. These centers and networks will also facilitate SMEs' access to information and to expensive infrastructure and equipment that would otherwise be out of reach.

This must be completed by appropriate efforts made to raise skills because the development of manufacturing technologies and their broad-based adoption depends heavily on the availability of a skilled workforce. Enhanced cooperation between industry and research also allows to improve skills along the value chain.

Build a European additive manufacturing strategy

In recent years, the EU has put forward initiatives favoring a number of Key Enabling Technologies (KETs) through an enhanced industrial policy part of the Europe 2020 Strategy. The European Task Force on Advanced Manufacturing Technologies was launched in 2013 and drafted an important report about the state of advanced manufacturing in the EU.

Nevertheless, the EU has not come up yet with a strategy for additive manufacturing matching the scope and ambitions of the US or Chinese policies.

Despite the apparent US domination in polymer-based AM applications, Europe



takes the global lead in the production of metal AM systems – capitalizing on its legacy in industrial production technologies. However, international competition is growing and Europe cannot afford to lag behind. The broad and early adoption of advanced manufacturing technologies will determine tomorrow's leaders in manufacturing. The EU should seriously consider conveying to the global business and investment community a powerful message: Europe is in the AM race, and support it by launching a European AM Strategy, that includes a comprehensive programme and concrete objectives supporting the industrialization of AM.

To start with, carrying out a stakeholder mapping exercise in Europe is indispensable. Currently, there is an information gap which prevents obtaining a global overview of research and technological AM capabilities in the EU. The evaluation and usage of AM technologies is therefore especially difficult for manufacturing SMEs. Because the AM landscape is made up of industry and research actors operating in diverse areas (e.g. software, material, services, equipment builders, laser applications etc.), a specific EU-wide platform could facilitate the exchange of information and innovation cooperation. The European Commission is well-positioned to facilitate the creation of such network.

By funding studies on AM, the EU could also help demonstrate the technology's variety of applications via technical, cost-benefit and market analysis. This would contribute to building a common European body of knowledge accessible by all relevant stakeholders who are willing to join the efforts for technology development. It is positive to see that DG GROW recently commissioned a study with these aspects in mind.

EU regions, on their end, could also play a role by identifying local AM capabilities, by investing their share of structural funds in the development/upgrading of manufacturing R&D&I centers while promoting their R&D&I infrastructures globally to attract private investment.



Furthermore, financing instruments should there be made available to support entrepreneurship, start-ups and SME growth, since AM is a field offering important opportunities for start-ups (e.g. service companies or software providers). Another type of support mechanism is inter-regional cooperation supporting the development of networked pilots and demonstrations.

Foresee the right framework conditions

Government policy can be instrumental in guiding the market development of new technologies. AM presents unique characteristics that reshuffles the roles of actors in the product design and development process of the industrial value chain. This creates issues related to liability and intellectual property and their clarification will be important to reassure the industrial community considering the adoption of AM. Furthermore, a lack of data related to production processes and material properties call for greater efforts in standardization, as to facilitate the broad-based adoption of AM technologies.

AM-made parts used in sectors where safety is especially critical like aerospace or medical need to go through qualification and certification procedures, which require attention from regulatory authorities. Finally, AM is a highly digitalized process: a sound ICT infrastructure coupled with data protection and security rules are also essential to create market confidence around the use of AM.

An early, inclusive dialogue between the EU, the industrial community and other relevant stakeholders will be of utmost importance to identify the relevant areas of action.

Attract private investments

Governments fund AM technologies and infrastructure for a purpose: the availability of cutting-edge research capability and skills in a given region serves as a magnet for investments. For example, in Germany, the €13 million worth Direct Manufacturing Center at the Paderborn University is co-financed by state funds as well as Boeing, EOS Electro Optical Systems, Evonik Industries and SLM Solutions. The Sheffield Advanced Manufacturing Centre in the UK is supported by a £200 million

six-year government programme for creating a network of innovation and technology centers. It also received EU structural funds during the creation phase in 2001 and now attracts investment from Boeing and Rolls Royce. Also in the UK, the Manufacturing Technology Research Center, specializing in net shape and additive manufacturing technologies, was established in 2010 with funding from Airbus and Aero Engine Controls.



Advocating towards the industrialization

Skills

Key statement: Education and skills are fundamental to tap into opportunities generated by AM technologies and to create high-quality jobs in Europe.

Main goal: Increase the awareness of AM technologies among education providers and learners and contribute to development of AM learning programmes

Action paths:

- Contribute to the development of AM specific training courses and certifications covering the whole value chain for technical professionals (design/modeling, processes, materials and applications) and for non-technical professionals (supply chain, logistics, new business models) by offering education providers insights on AM skills needed by manufacturers.

Standards and certification

Key statement: Uniform standardization is fundamental to support the development of AM.

Main goal: Joint AM standards development

Action paths:

- Establish coordination among AM specialized TCs of standardization bodies: ASTM F42, ISO TC261, and CEN CENELEC TC 438.
- Regularly raise MT companies and national AM associations/stakeholders' awareness.
- Collect input from AM stakeholders about standardization and certification requirements along the value chain.

CECIMO's actions in support of the additive manufacturing industry

- ✓ **Market intelligence:** CECIMO provides a single platform through which the latest developments in technology and markets are monitored, and information and best practices are exchanged between participants. The CECIMO website and social media tools are used to disseminate information.
- ✓ **Advocacy:** CECIMO establishes a dialogue between the industry and EU decision-makers to explain the regulatory and policy related challenges facing AM's development. CECIMO provides its input as an expert to the European Commission on regulatory aspects (e.g. liability, certification, health and safety, IPR). The association is also partner in a research consortium that conducts a study, funded by the European Commission, on AM applications and European capabilities.
- ✓ **Communication and raising awareness:** CECIMO organizes and gives support to conferences, seminars and other events to raise awareness about AM among industry players, policy-makers and the broader society. The first edition of the Additive Manufacturing European Conference took place on 23 June 2015 at the European Parliament in Brussels. EMO Milano 2015, the world metal working exhibition promoted by CECIMO, presents a special area dedicated to AM technologies and an international conference on AM.
- ✓ **Innovation cooperation:** CECIMO offers a platform for the machine tool builders' community and other players in the AM value chain, including software, services and material suppliers to exchange information and best practices as well as to initiate joint actions in research and development. Via its participation in the AM-platform (the European technology sub-platform in additive manufacturing) and EFFRA (the European Factories of the Future Association), CECIMO conveys the industry's R&D needs to the European Commission.
- ✓ **Standardisation:** Standards are key to the broad-based adoption and market uptake of AM. CECIMO is a member of the ASTM F42 Committee on Additive Manufacturing, and holds direct contacts with other standardisation bodies: ISO/TC261 and CEN/CENELEC TC438. This allows grasping a global overview of standardisation activities while ensuring cohesion in order to secure open and global standards.

of additive manufacturing

Development of AM applications and usage

Key statement: SMEs are the backbone of the European industry and their limited resources are often an obstacle to the adoption of AM systems.

Main goal: The further adoption of AM technologies by European SMEs

Action paths:

- Map AM technologies in Europe.
- Raise the European manufacturing SMEs' awareness and develop practical opportunities to test AM technologies by coordinating EU AM platforms/sites/centers.
- Support SMEs' access to finance to invest AM technologies investments.

European projects on AM

Key statement: The EU support to AM related projects is growing.

Main goal: A stronger impact of European AM related projects

Action paths:

- Map existing EU AM projects.
- Coordinate EU AM projects participants
- CECIMO direct participation to EU projects:
 - DG GROW study on 3D printing value chains
 - 3DPrism project on vocational education and training

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Member Associations:

Austria: FMMI

Fachverband Maschinen & Metallwaren
Industrie

www.fmmi.at

Belgium: AGORIA

Federation for the technology industry

www.agoria.be

Czech Republic: SST

Svazu Strojírenské Technologie

www.sst.cz

Denmark: The Manufacturing Industry

a part of the Confederation
of Danish Industry

www.ffi.di.dk

Finland: Federation of Finnish Technology
Industries

www.teknologiateollisuus.fi

France: SYMOP

French Association for
Manufacturing Technologies

www.symop.com/fr

Germany: VDW

Verein Deutscher
Werkzeugmaschinenfabriken e.V.

www.vdw.de

Italy: UCIMU - SISTEMI PER PRODURRE

Associazione dei costruttori Italiani di
macchine utensili robot e automazione

www.ucimu.it

Netherlands: VIMAG

Federatie Productie Technologie /
Sectie VIMAG

www.ftpvimag.nl

Portugal: AIMMAP

Associação dos Industriais Metalúrgicos,
Metalomecânicos e Afins de Portugal

www.aimmap.pt

Spain: AFM

Advanced Manufacturing Technologies

www.afm.es

Sweden: MTAS

Machine and Tool Association of Sweden

www.mtas.se

Switzerland: SWISSMEM

Die Schweizer Maschinen-, Elektro- und
Metall-Industrie

www.swissmem.ch

Turkey: MIB

Makina İmalatçıları Birliği

www.mib.org.tr

United Kingdom: MTA

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